

WHAT IS CLAIMED IS:

1           1. An isolated sweet taste receptor comprising a T1R3 polypeptide,  
2 wherein the T1R3 polypeptide is encoded by a nucleotide sequence that hybridizes under  
3 moderately stringent hybridization conditions to a nucleotide sequence encoding an amino  
4 acid sequence of SEQ ID NO:15, 20, 23, or 25.

1           2. The isolated receptor of claim 1, wherein the T1R3 polypeptide is  
2 encoded by a nucleotide sequence that hybridizes under highly stringent hybridization  
3 conditions to a nucleotide sequence encoding an amino acid sequence of SEQ ID NO:15, 20,  
4 23, or 25.

1           3. The isolated receptor of claim 1, wherein the T1R3 polypeptide has an  
2 amino acid sequence of SEQ ID NO:15, 20, 23, or 25.

1           4. The isolated receptor of claim 1, wherein the receptor comprises a  
2 T1R3 polypeptide and a heterologous polypeptide.

1           5. The isolated receptor of claim 4, wherein the T1R3 polypeptide and the  
2 heterologous polypeptide are non-covalently linked.

1           6. The isolated receptor of claim 4, wherein the T1R3 polypeptide and the  
2 heterologous polypeptide are covalently linked.

1           7. The isolated receptor of claim 4, wherein the heterologous polypeptide  
2 is a T1R1 polypeptide that is encoded by a nucleotide sequence that hybridizes under  
3 moderately stringent hybridization conditions to a nucleotide sequence encoding an amino  
4 acid sequence of SEQ ID NO:1, 2, or 3.

1           8. The isolated receptor of claim 4, wherein the heterologous polypeptide  
2 is a T1R1 polypeptide that is encoded by a nucleotide sequence that hybridizes under highly  
3 stringent hybridization conditions to a nucleotide sequence encoding an amino acid sequence  
4 of SEQ ID NO:1, 2, or 3.

1           9. The isolated receptor of claim 7, wherein the T1R1 polypeptide has an  
2 amino acid sequence of SEQ ID NO:1, 2, or 3.

1                   10. The isolated receptor of claim 4, wherein the heterologous polypeptide  
2 is a T1R2 polypeptide that is encoded by a nucleotide sequence that hybridizes under  
3 moderately stringent hybridization conditions to a nucleotide sequence encoding an amino  
4 acid sequence of SEQ ID NO:7, 8, or 9.

1                   11. The isolated receptor of claim 4, wherein the heterologous polypeptide  
2 is a T1R2 polypeptide is encoded by a nucleotide sequence that hybridizes under highly  
3 stringent hybridization conditions to a nucleotide sequence encoding an amino acid sequence  
4 of SEQ ID NO:7, 8, or 9.

1                   12. The isolated receptor of claim 10, wherein the T1R2 polypeptide has  
2 an amino acid sequence of SEQ ID NO:7, 8, or 9.

1                   13. The isolated receptor of claim 1, wherein the receptor has G protein  
2 coupled receptor activity.

1                   14. The isolated receptor of claim 1, wherein the receptor specifically  
2 binds to antibodies raised against SEQ ID NO: 15, 20, 23, or 25.

1                   15. An isolated sweet taste receptor comprising a T1R3 polypeptide and a  
2 T1R1 polypeptide, wherein the T1R3 polypeptide is encoded by a nucleotide sequence that  
3 hybridizes under highly stringent hybridization conditions to a nucleotide sequence encoding  
4 an amino acid sequence of SEQ ID NO:15, 20, 23, or 25; and wherein the T1R1 polypeptide  
5 that is encoded by a nucleotide sequence that hybridizes under moderately stringent  
6 hybridization conditions to a nucleotide sequence encoding an amino acid sequence of SEQ  
7 ID NO:1, 2, or 3.

1                   16. An isolated sweet taste receptor comprising a T1R3 polypeptide and a  
2 T1R2 polypeptide, wherein the T1R3 polypeptide is encoded by a nucleotide sequence that  
3 hybridizes under highly stringent hybridization conditions to a nucleotide sequence encoding  
4 an amino acid sequence of SEQ ID NO:15, 20, 23, or 25; and wherein the T1R2 polypeptide  
5 that is encoded by a nucleotide sequence that hybridizes under moderately stringent  
6 hybridization conditions to a nucleotide sequence encoding an amino acid sequence of SEQ  
7 ID NO:7, 8, or 9.

1                   17. An antibody that specifically binds to the taste receptor claim 1.

1                   18. The antibody of claim 17, wherein the antibody specifically binds to a  
2 taste receptor comprising T1R1 and T1R3.

1                   19. The antibody of claim 18, wherein the T1R1 polypeptide and the T1R3  
2 polypeptide are non-covalently linked.

1                   20. The antibody of claim 18, wherein the T1R1 polypeptide and the T1R3  
2 polypeptide are covalently linked.

1                   21. The antibody of claim 17, wherein the antibody specifically binds to a  
2 taste receptor comprising T1R2 and T1R3.

1                   22. The antibody of claim 21, wherein the T1R2 polypeptide and the T1R3  
2 polypeptide are non-covalently linked.

1                   23. The antibody of claim 21, wherein the T1R2 polypeptide and the T1R3  
2 polypeptide are covalently linked.

1                   24. A method of identifying a compound that modulates sweet taste signal  
2 transduction in taste cells, the method comprising the steps of

3                   (i) contacting the compound with a sweet taste receptor comprising a T1R3  
4 polypeptide, wherein the T1R3 polypeptide is encoded by a nucleotide sequence that  
5 hybridizes under moderately stringent hybridization conditions to a nucleotide sequence  
6 encoding an amino acid sequence of SEQ ID NO:15, 20, 23, or 25; and

7                   (ii) determining the functional effect of the compound upon the receptor,  
8 thereby identifying a compound that modulates sweet signal transduction.

1                   25. The method of claim 24, wherein the T1R3 polypeptide is encoded by  
2 a nucleotide sequence that hybridizes under highly stringent hybridization conditions to a  
3 nucleotide sequence encoding an amino acid sequence of SEQ ID NO:15, 20, 23, or 25

1                   26. The method of claim 24, wherein the receptor comprises a T1R3  
2 polypeptide and a heterologous polypeptide.

1                   27. The method of claim 25, wherein the T1R3 polypeptide and the  
2 heterologous polypeptide are non-covalently linked.

1                   28. The method of claim 25, wherein the heterologous polypeptide is a  
2 T1R1 polypeptide encoded by a nucleotide sequence that hybridizes under moderately  
3 stringent hybridization conditions to a nucleotide sequence encoding an amino acid sequence  
4 of SEQ ID NO:1, 2, or 3.

1                   29. The method of claim 25, wherein the heterologous polypeptide is a  
2 T1R1 polypeptide encoded by a nucleotide sequence that hybridizes under highly stringent  
3 hybridization conditions to a nucleotide sequence encoding an amino acid sequence of SEQ  
4 ID NO:1, 2, or 3.

1                   30. The method of claim 25, wherein the T1R1 polypeptide has an amino  
2 acid sequence of SEQ ID NO:1, 2, or 3.

1                   31. The method of claim 25, wherein the heterologous polypeptide is a  
2 T1R2 polypeptide encoded by a nucleotide sequence that hybridizes under moderately  
3 stringent hybridization conditions to a nucleotide sequence encoding an amino acid sequence  
4 of SEQ ID NO:7, 8, or 9.

1                   32. The method of claim 25, wherein the heterologous polypeptide is a  
2 T1R2 polypeptide encoded by a nucleotide sequence that hybridizes under highly stringent  
3 hybridization conditions to a nucleotide sequence encoding an amino acid sequence of SEQ  
4 ID NO:7, 8, or 9.

1                   33. The method of claim 25, wherein the T1R2 polypeptide has an amino  
2 acid sequence of SEQ ID NO:6, 7, or 8.

1                   34. The method of claim 24, wherein the receptor is recombinant.

1                   35. The method of claim 24, wherein the receptor has G protein coupled  
2 receptor activity.

1                   36. The method of claim 24, wherein the functional effect is measured *in*  
2 *vitro*.

1                   37. The method of claim 36, wherein the functional effect is a physical  
2 effect.

1                           41.    The method of claim 24, wherein the receptor is expressed in a cell or  
2    cell membrane.

1                   43.     The method of claim 42, wherein the functional effect is determined by  
2     measuring ligand binding to the receptor.

1 44. The method of claim 43, wherein the functional effect is determined by  
2 measuring binding of a compound to the extracellular domain of the receptor.

1 45. The method of claim 41, wherein the functional effect is a chemical or  
2 phenotypic effect.

1                   46.     The method of claim 45, wherein the functional effect is determined by  
2 measuring changes in intracellular cAMP, IP<sub>3</sub>, or Ca<sup>2+</sup>.

1 47. The method of claim 41, wherein the cell is a mammalian cell.

1 48. The method of claim 47, wherein the cell is a human cell.

1 49. A method of identifying a compound that modulates sweet taste signal  
2 transduction in taste cells, the method comprising the steps of

3 (i) contacting the compound with cell expressing a sweet taste receptor  
4 comprising a T1R3 polypeptide and a T1R2 polypeptide, wherein the T1R3 polypeptide is  
5 encoded by a nucleotide sequence that hybridizes under highly stringent hybridization  
6 conditions to a nucleotide sequence encoding an amino acid sequence of SEQ ID NO:15, 20,  
7 23, or 25; and wherein the T1R2 polypeptide that is encoded by a nucleotide sequence that

8 hybridizes under moderately stringent hybridization conditions to a nucleotide sequence  
9 encoding an amino acid sequence of SEQ ID NO:7, 8, or 9; and  
10 (ii) determining the functional effect of the compound upon the receptor,  
11 thereby identifying a compound that modulates sweet signal transduction.

1 50. The method of claim 49, wherein the T1R2 polypeptide and the T1R3  
2 polypeptide are non-covalently linked.

1 51. The method of claim 49, wherein the T1R2 polypeptide and the T1R3  
2 polypeptide are covalently linked.

1 52. A method of identifying a compound that modulates sweet taste signal  
2 transduction in taste cells, the method comprising the steps of  
3 (i) contacting the compound with cell expressing a sweet taste receptor  
4 comprising a T1R3 polypeptide and a T1R1 polypeptide, wherein the T1R3 polypeptide is  
5 encoded by a nucleotide sequence that hybridizes under highly stringent hybridization  
6 conditions to a nucleotide sequence encoding an amino acid sequence of SEQ ID NO:15, 20,  
7 23, or 25; and wherein the T1R1 polypeptide that is encoded by a nucleotide sequence that  
8 hybridizes under moderately stringent hybridization conditions to a nucleotide sequence  
9 encoding an amino acid sequence of SEQ ID NO:1, 2, or 3; and  
10 (ii) determining the functional effect of the compound upon the receptor,  
11 thereby identifying a compound that modulates sweet signal transduction.

1 53. The method of claim 52, wherein the T1R1 polypeptide and the T1R3  
2 polypeptide are non-covalently linked.

1 54. The method of claim 52, wherein the T1R1 polypeptide and the T1R3  
2 polypeptide are covalently linked.